

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BOARD OF PATENT APPEALS AND INTERFERENCES**

In Re Application of:

Duvaut *et al.*

Serial No.: 10/626,714

Filed: July 25, 2003

Confirmation No.: 1895

Group Art Unit: 2611

Examiner: Tse, Young Toi

TKHR Ref: 060707.1450

Client Ref: GV234

For: **DBMSOL AND FBMSOL POWER SPECTRAL DENSITY MASKS**

**APPEAL BRIEF SUBMITTED UNDER 37 C.F.R. 41.37**

Mail Stop Appeal Brief - Patents  
Commissioner of Patents and Trademarks  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

Sir:

This is an appeal from the rejection of Young Toi Tse, Group Art Unit 2611, mailed February 9, 2007, rejecting all claims 1-28 in the present application and making the rejection FINAL.

**I. REAL PARTY IN INTEREST**

The real party in interest of the instant application is Brooktree Broadband Holding, Inc., of 4000 Macarthur Blvd., Newport Beach, California 92660, as reflected in the assignment recorded at reel/frame 018826/0939.

**II. RELATED APPEALS AND INTERFERENCES**

There are no related appeals or interferences.

### III. STATUS OF THE CLAIMS

The FINAL Office Action has rejected all claims 1-28, and Applicant hereby appeals the rejection as to all claims.

### IV. STATUS OF AMENDMENTS

All amendments made before the FINAL Office Action were entered. An attempted amendment in response to the FINAL Office Action was not entered. Attached hereto as Appendix A is a listing of the claims in their current form (prior to the FINAL Office Action).

### V. SUMMARY OF CLAIMED SUBJECT MATTER

Embodiments of the claimed subject matter are illustrated in FIGs. 2 and 4-26 and are discussed in the specification at least at pages 5-78.

Embodiments of the invention, such as that of claim 1, define a Digital Subscriber Line (DSL) communications system (see e.g., FIG. 2 and p. 7 lines 5-6 and 28-29) configured to provide a power spectral density (PSD) mask (e.g., p. 5, lines 12-13) for spectral shaping of a dual bit map (DBM) mode downstream transmission, the PSD mask represented by an equation:

$$PSD_{DBMsOL} = K_{ADSL\_OL} \times \frac{C}{f_0} \times \frac{\left[ \sin\left(\pi \frac{f}{f_0}\right) \right]^2}{\left( \pi \frac{f}{f_0} \right)^2} \times \frac{1}{1 + \left( \frac{f}{f_{LP3dB}} \right)^{12}} \times \frac{1}{1 + \left( \frac{f_{HP3dB}}{f} \right)^6}, \quad 0 < f < \infty$$

(see e.g., p. 5, line 13 through p. 6, line 8) where  $PSD_{DBMsOL}$  represents the PSD mask,  $K_{ADSL\_OL}$  represents a constant value,  $C$  represents a constant value,  $f$  represents a frequency of the downstream transmission,  $f_0$  represents a constant value,  $f_{LP3dB}$  represents a 3 decibel (dB) low pass frequency and  $f_{HP3dB}$  represents a 3 dB high pass frequency.

Embodiments of the invention, such as that of claim 15, define a Digital Subscriber Line (DSL) communications system (see e.g., FIG. 2 and p. 7 lines 5-6 and 28-29) configured to provide a power spectral density (PSD) mask (e.g., p. 6, lines 10-11) for spectral shaping of a far end cross talk (FEXT) bit map (FBM) mode downstream transmission, the PSD mask represented by an equation:

$$PSD_{FBMsOL} = K_{ADSL\_OL} \times \frac{C}{f_0} \times \frac{\left[ \sin\left(\pi \frac{f}{f_0}\right) \right]^2}{\left(\pi \frac{f}{f_0}\right)^2} \times \frac{1}{1 + \left(\frac{f}{f_{LP3dB}}\right)^{12}} \times \frac{1}{1 + \left(\frac{f_{HP3dB}}{f}\right)^8}, \quad 0 < f < \infty$$

(see e.g., p. 6, line 10 through p. 7, line 4) where  $PSD_{FBMsOL}$  represents the PSD mask,  $K_{ADSL\_OL}$  represents a constant value,  $C$  represents a constant value,  $f$  represents a frequency of the downstream transmission,  $f_0$  represents a constant value,  $f_{LP3dB}$  represents a 3 decibel (dB) low pass frequency and  $f_{HP3dB}$  represents a 3 dB high pass frequency.

## **VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL**

Claims 1-28 stand rejected under 35 U.S.C 101 as allegedly directed to nonstatutory subject matter.

## **VII. ARGUMENT**

In the Final Office Action dated February 9, 2007, the Examiner erroneously rejected both independent claims 1 and 15 under 35 U.S.C. § 101 as being directly related to non-statutory subject matter. In this regard, the Office Action stated:

Claims 1-28 are directly related to non-statutory subject matter because the claimed subject matters of independent claims 1 and 15 are directly related to non-statutory mathematical algorithms of an equation for calculating a power spectral density (PSD) mask for spectral shaping of a dual bit mab (DMB) mode downstream transmission and an equation for calculating a power spectral density (PSD) mask for spectral shaping of a far end cross talk (FEXT) bit map (FBM) mode downstream transmission.

This rejection is clearly in error because claims 1 and 15 are each directed to “A Digital Subscriber Line (DSL) communication system...,” which is clearly patentable subject matter under 35 U.S.C. § 101 and the guidelines described in the Official Gazette Notice of November 22, 2005, Section I.

Simply stated, the Examiner has unduly focused on the mathematical equations embodied in claims 1 and 15 to proclaim these claims as being directed to mathematical algorithms. Although mathematical algorithms per se are nonstatutory: “a process is not unpatentable simply because it contains a law of nature or a mathematical algorithm.” Parker v. Flook, 437 U.S. 584 at 590 (1978). Indeed, as Supreme Court Justice Stone stated many year ago: “While a scientific truth, or the mathematical expression of it, is

not patentable invention, a novel and useful structure created with the aid of knowledge of scientific truth may be." Mackay Radio & Telegraph Co. v. Radio Corp. of America, 306 U.S. 86 at 94 (1939).

In the present application, the Examiner has simply ignored essential claimed features to maintain the rejection. In this regard, independent claims 1 and 15 recite:

**1. A Digital Subscriber Line (DSL) communications system**

configured to provide a power spectral density (PSD) mask for spectral shaping of a dual bit map (DBM) mode downstream transmission, the PSD mask represented by an equation:

$$PSD_{DBMsOL} = K_{ADSL\_OL} \times \frac{C}{f_0} \times \frac{\left[ \sin\left(\pi \frac{f}{f_0}\right) \right]^2}{\left( \pi \frac{f}{f_0} \right)^2} \times \frac{1}{1 + \left( \frac{f}{f_{LP3dB}} \right)^{12}} \times \frac{1}{1 + \left( \frac{f_{HP3dB}}{f} \right)^6}, \quad 0 < f < \infty$$

where  $PSD_{DBMsOL}$  represents the PSD mask,  $K_{ADSL\_OL}$  represents a constant value,  $C$  represents a constant value,  $f$  represents a frequency of the downstream transmission,  $f_0$  represents a constant value,  $f_{LP3dB}$  represents a 3 decibel (dB) low pass frequency and  $f_{HP3dB}$  represents a 3 dB high pass frequency.

**15. A Digital Subscriber Line (DSL) communications system**

configured to provide a power spectral density (PSD) mask for spectral shaping of a far end cross talk (FEXT) bit map (FBM) mode downstream transmission, the PSD mask represented by an equation:

$$PSD_{FBMsOL} = K_{ADSL\_OL} \times \frac{C}{f_0} \times \frac{\left[ \sin\left(\pi \frac{f}{f_0}\right) \right]^2}{\left( \pi \frac{f}{f_0} \right)^2} \times \frac{1}{1 + \left( \frac{f}{f_{LP3dB}} \right)^{12}} \times \frac{1}{1 + \left( \frac{f_{HP3dB}}{f} \right)^8}, \quad 0 < f < \infty$$

where  $PSD_{FBMsOL}$  represents the PSD mask,  $K_{ADSL\_OL}$  represents a constant value,  $C$  represents a constant value,  $f$  represents a frequency of the downstream transmission,  $f_0$  represents a constant value,  $f_{LP3dB}$  represents a 3 decibel (dB) low pass frequency and  $f_{HP3dB}$  represents a 3 dB high pass frequency.

(*Emphasis added*). As is clear from the express language of the claims, both claims 1 and 15 are directed to a Digital Subscriber Line (DSL) communications system. As such, the claims are clearly patentable subject matter under 35 U.S.C. § 101. The Examiner, however, improperly ignored this claim language.

To assess patentability, the Examiner must consider ALL features of the claim, and cannot ignore portions of his choosing to support such a rejection. The Court of Appeals for the Federal Circuit has made this point clear time and time again. For example, in *In re Lowry*, the Federal Circuit stated: “The Patent and Trademark Office (PTO) must consider all claim limitations when determining patentability.” *In re Lowry*, 32 F.3d 1579 (Fed. Cir. 1994).

Perhaps more illuminating in the present application is the Federal Circuit’s decision in *In re Warmerdam*, 3 F.3d 1354 (Fed. Cir. 1994). In that case, the Federal Circuit upheld a rejection of claim 1 (as directed to a mathematical algorithm), but reversed a rejection of claim 5, stating that “Claim 5 is for a machine, and is clearly patentable subject matter.” *In re Warmerdam* at 1360. The claims at issue in that case are set forth below:

1. A method for generating a data structure which represents the shape of [sic] physical object in a position and/or motion control machine as a hierarchy of bubbles, comprising the steps of:
  - first locating the medial axis of the object and
  - then creating a hierarchy of bubbles on the medial axis.
5. A machine having a memory which contains data representing a bubble hierarchy generated by the method of any of Claims 1 through 4.

As can be clearly verified from the claims reproduced above, claim 5 merely added

(over claim 1) the feature of “A machine having a memory ...” In the same way, independent claims 1 and 15 define “A Digital Subscriber Line (DSL) communications system ...” This additional language, clearly brings these claims into the realm of patentable subject matter (even if the remainder of the claims is considered to be nothing more than a mathematical algorithm). As noted above, however, the Examiner has not even addressed this language of the claims.

For at least the foregoing reasons, the rejections of independent claims 1 and 15 (and therefore all claims) should be overturned.

In addition to the foregoing, the rejection doesn't comply with the examination guidelines for assessing claims under 35 U.S.C. § 101. In this regard, USPTO Official Gazette Notice of November 22, 2005 (“the OG Notice”), provided interim guidelines for examination of patent applications for subject matter eligibility.

The OG Notice first provides assistance to examiners in understanding recent court decisions that interpret the requirements of 35 U.S.C. § 101. In particular, the OG Notice explicitly acknowledges the breadth of what may qualify as a “patentable invention”:

As the Supreme Court held, Congress chose the expansive language of 35 U.S.C. Sec. 101 so as to include “anything under the sun that is made by man.” Diamond v. Chakrabarty, 447 U.S. 303, 308-09, 206 USPQ 193, 197 (1980). . . .

*Official Gazette Notice of November 22, 2005, Section IV.A.*

Despite such inclusive language, the OG Notice indicates that there are limitations to what can be patented:

Federal courts have held that 35 U.S.C. Sec. 101 does have certain limits. First, the phrase "anything under the sun that is made by man" is limited by the text of 35 U.S.C. Sec. 101, meaning that one may only patent something that is a machine, manufacture, composition of matter or a process. . . .

The subject matter courts have found to be outside of, or exceptions to, the four statutory categories of invention is limited to abstract ideas, laws of nature and natural phenomena.

*Official Gazette Notice* of November 22, 2005, Section IV.A.

Therefore, an invention is patentable under 35 U.S.C. § 101 as long as it: (i) falls within one of the explicit statutory categories identified in 35 U.S.C. § 101 and (ii) does not comprise one of an abstract idea, a law of nature, or a natural phenomenon (i.e., the three "judicial exceptions").

The OG Notice next provides explicit instructions to examiners as to how to determine whether a claim falls within a statutory category of 35 U.S.C. § 101:

To properly determine whether a claimed invention complies with the statutory invention requirements of 35 U.S.C. 101, USPTO personnel must first identify whether the claim falls within at least one of the four enumerated categories of patentable subject matter recited in section 101 (process, machine, manufacture or composition of matter).

*Official Gazette Notice* of November 22, 2005, Section IV.B.

In the present application, the claimed system uses a mathematical algorithm to produce downstream transmissions, and falls under a statutory category of 35 U.S.C. § 101. That the system merely uses algorithms to produce down stream transmissions, does not make the system unpatentable. Thus, for at least this reason, the rejection of claim 1 under 35 U.S.C. § 101 should be withdrawn.

Additionally, even if, *arguendo*, the system of claim 1 does not fall into a statutory category of 35 U.S.C. § 101, claim 1 would still be patentable under the statute because



it would fall under one of the judicial exceptions.

The OG Notice provides explicit instructions to examiners as to how to determine whether a claim falls within one of the judicial exceptions:

Determining whether the claim falls within one of the four enumerated categories of patentable subject matter recited in 35 U.S.C. Sec. 101 (process, machine, manufacture or composition of matter) does not end the analysis because claims directed to nothing more than abstract ideas (such as mathematical algorithms), natural phenomena, and laws of nature are not eligible and therefore are excluded from patent protection. . . .

. . . In evaluating whether a claim meets the requirements of section 101, the claim must be considered as a whole to determine whether it is for a particular application of an abstract idea, natural phenomenon, or law of nature, rather than for the abstract idea, natural phenomenon, or law of nature itself.

*Official Gazette Notice* of November 22, 2005, Section IV.C.

The OG Notice further states that a claim that relates to an abstract idea, natural phenomenon, or law of nature may still be patentable:

While abstract ideas, natural phenomena, and laws of nature are not eligible for patenting, methods and products employing abstract ideas, natural phenomena, and laws of nature to perform a real-world function may well be.

*Official Gazette Notice* of November 22, 2005, Section IV.C.

On that issue, the OG Notice expresses that “practical applications” of the judicial exceptions can be patentable and provides specific guidelines to aid examiners in determining whether a practical application of one of the judicial exceptions is claimed:

To satisfy section 101 requirements, the claim must be for a practical application of the Sec. 101 judicial exception, which can be identified in various ways:

- The claimed invention “transforms” an article or physical object to a different state or thing.

- The claimed invention otherwise produces a useful, concrete and tangible result, based on the factors discussed below.

*Official Gazette Notice* of November 22, 2005, Section IV.C.2.

Therefore, if a claim is related to one of the judicial exceptions there must be an appropriate “transformation” or otherwise must be a “useful, concrete, and tangible result.”

From the foregoing, it is apparent that the issue of whether a “tangible result” is claimed is *only* to be considered if: (1) the claimed invention concerns one of the judicial exceptions (i.e., abstract ideas, natural phenomena, and laws of nature) *and* (2) the claimed invention does not “transform” an article or physical object to a different state or thing.

Thus, even if, *arguendo*, claim 1 fell under one of the judicial exceptions, the Examiner is bound to consider the claim as a whole to determine if it is directed towards a particular application of an abstract idea. Claimed features of claim 1 include an abstract idea (an algorithm) to affect a transmission. Though an algorithm by itself is an abstract idea, a transmission is a useful, concrete, and tangible result from the application of the algorithm, in that it is a passage of electromagnetic energy. In addition, the claims expressly clarify that the subject matter sought to be patented is a Digital Subscriber Line (DSL) communications system.

Further, Applicants respectfully submit that a transmission is in fact tangible for at least the reason that the transmission is measurable. That one may not be able to perceive the transmission without measurement equipment, does not make the transmission any less tangible than the sound waves produced by a dog whistle that are imperceptible to humans, but audible to canines.

Thus, evaluating each of claim 1 and claim 15 as a whole one must conclude that since the abstract idea (the algorithm) claimed is directed towards the tangible result of effecting a downstream transmission, claims 1 and 15 satisfy the judicial exception of 35 U.S.C. § 101.

Therefore, since claims 1 and 15 constitute statutory subject matter, the rejection of claims 1 and 15 (and dependent claims 2-14 and 16-28) under 35 U.S.C. § 101 is clearly in error, and should be overturned.

Further still, the rejection of the present claims is inconsistent with the Examination methodology being carried out by the Patent Office in other applications. In accordance with the Administrative Procedures Action, the U.S. Patent & Trademark Office (as an administrative agency), must treat all applicants equally and fairly. Simply stated, the Patent Office is allowing patents to issue to other applicants with claims that are comparable (from a statutory perspective) to the claims that are presently rejected.

For example, consider U.S. Patent 7,167,548, which was issued in January 2007. Claim 1 of that patent recites:

1. An apparatus, comprising: one or more processors; and a memory coupled to the processors ***comprising instructions executable by the processors, the processors operable when executing the instructions to: establish an initial training session for a connection having a first bit rate and terminating on a modem, the initial training session established using initial default gain settings determined independently of actual power spectral density mask parameters that correspond to the modem; identify the actual power spectral density mask parameters that correspond to the modem after completion of the initial training session; generate custom gain settings that are configured to vary the connection to include a second bit rate that is greater than the first bit rate, the***

***custom gain settings bounded according to the identified actual power spectral density mask parameters; and conducting a new training session using the custom gain settings, the new training session varying the connection to include the second bit rate that is greater than the first bit rate.***

(*Emphasis added*). The features emphasized above embody an algorithm for performing an initial training session for a modem, and as such the claim is largely directed to an algorithm. However, preceding these steps, the claim first specifies that it is defining “An apparatus, comprising one or more processors.” This language is sufficient to bring the subject matter of the claim into compliance with 35 U.S.C. § 101. In the same way, the preamble of “A Digital Subscriber Line (DSL) communications system ...” of claims 1 and 15 of the present application is sufficient to bring these claims into compliance with 35 U.S.C. § 101.

For at least this additional reason, the outstanding rejection should be overturned.

### **CONCLUSION**

Based upon the foregoing discussion, Applicants respectfully requests that the Examiner’s final rejection of claims 1-28 be overruled by the Board, and that the application be allowed to issue as a patent with all pending claims.

In addition to the claims of Appendix A, Appendix B attached hereto indicates that there is no evidence being submitted in connection with this Appeal Brief, and Appendix C attached hereto indicates that there are no related proceedings.

A deposit account authorization is provided herewith to cover the \$500 fee for the Appeal Brief. There is believed to be no additional fee due in connection with this brief. If, however, any additional fee is deemed to be payable, you are hereby authorized to charge any such fee to deposit account 50-0835.

Respectfully submitted,

/Daniel R. McClure/

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## VIII. CLAIMS - APPENDIX

1. A Digital Subscriber Line (DSL) communications system configured to provide a power spectral density (PSD) mask for spectral shaping of a dual bit map (DBM) mode downstream transmission, the PSD mask represented by an equation:

$$PSD_{DBMsOL} = K_{ADSL\_OL} \times \frac{C}{f_0} \times \frac{\left[ \sin\left(\pi \frac{f}{f_0}\right) \right]^2}{\left( \pi \frac{f}{f_0} \right)^2} \times \frac{1}{1 + \left( \frac{f}{f_{LP3dB}} \right)^{12}} \times \frac{1}{1 + \left( \frac{f_{HP3dB}}{f} \right)^6}, \quad 0 < f < \infty$$

where  $PSD_{DBMsOL}$  represents the PSD mask,  $K_{ADSL\_OL}$  represents a constant value,  $C$  represents a constant value,  $f$  represents a frequency of the downstream transmission,  $f_0$  represents a constant value,  $f_{LP3dB}$  represents a 3 decibel (dB) low pass frequency and  $f_{HP3dB}$  represents a 3 dB high pass frequency.

2. The PSD mask as in Claim 1, wherein  $K_{ADSL\_OL}$  has a value between 0.0900 watts and 0.1200 watts.

3. The PSD mask as in Claim 2, wherein  $K_{ADSL\_OL}$  has a value of 0.1104 watts.

4. The PSD mask as in Claim 1, wherein  $f_0$  has a value between 2.100 megahertz and 2.300 megahertz.

5. The PSD mask as in Claim 4, wherein  $f_0$  has a value of 2.208 megahertz.

6. The PSD mask as in Claim 1,  $f_{LP3dB}$  has a value substantially equal to  $\frac{f_0}{2}$ .

7. The PSD mask as in Claim 1, wherein  $f_{HP3dB}$  has a value between 100 kilohertz and 150 kilohertz.

8. The PSD mask as in Claim 7, wherein  $f_{HP3dB}$  has a value of 130 kilohertz.

9. The PSD mask as in Claim 1, wherein  $C$  has a value between 0.1 and 10.

10. The PSD mask as in Claim 9, wherein  $C$  has a value of 2.

11. The PSD mask as in Claim 10, wherein  $f_{HP3dB}$  has a value of 130 kilohertz.

12. The PSD mask as in Claim 11,  $f_{LP3dB}$  has a value substantially equal to  $\frac{f_0}{2}$ .

13. The PSD mask as in Claim 12, wherein  $K_{ADSL\_OL}$  has a value of 0.1104 watts.

14. The PSD mask as in Claim 13, wherein  $f_0$  has a value of 2.208 megahertz.

15. A Digital Subscriber Line (DSL) communications system configured to provide a power spectral density (PSD) mask for spectral shaping of a far end cross talk (FEXT) bit map (FBM) mode downstream transmission, the PSD mask represented by an equation:

$$PSD_{FBMsOL} = K_{ADSL\_OL} \times \frac{C}{f_0} \times \frac{\left[ \sin\left(\pi \frac{f}{f_0}\right) \right]^2}{\left( \pi \frac{f}{f_0} \right)^2} \times \frac{1}{1 + \left( \frac{f}{f_{LP3dB}} \right)^{12}} \times \frac{1}{1 + \left( \frac{f_{HP3dB}}{f} \right)^8}, \quad 0 < f < \infty$$

where  $PSD_{FBMsOL}$  represents the PSD mask,  $K_{ADSL\_OL}$  represents a constant value,  $C$  represents a constant value,  $f$  represents a frequency of the downstream transmission,  $f_0$  represents a constant value,  $f_{LP3dB}$  represents a 3 decibel (dB) low pass frequency and  $f_{HP3dB}$  represents a 3 dB high pass frequency.

16. The PSD mask as in Claim 15, wherein  $K_{ADSL\_OL}$  has a value between 0.0900 watts and 0.1200 watts.

17. The PSD mask as in Claim 16, wherein  $K_{ADSL\_OL}$  has a value of 0.1104 watts.

18. The PSD mask as in Claim 15, wherein  $f_0$  has a value between 2.100 megahertz and 2.300 megahertz.

19. The PSD mask as in Claim 18, wherein  $f_0$  has a value of 2.208 megahertz.



20. The PSD mask as in Claim 15,  $f_{LP3dB}$  has a value substantially equal to  $\frac{f_0}{2}$ .

21. The PSD mask as in Claim 15, wherein  $f_{HP3dB}$  has a value between 27 kilohertz and 40 kilohertz.

22. The PSD mask as in Claim 21, wherein  $f_{HP3dB}$  has a value of 32 kilohertz.

23. The PSD mask as in Claim 15, wherein  $C$  has a value between 0.1 and 10.

24. The PSD mask as in Claim 23, wherein  $C$  has a value of 2.

25. The PSD mask as in Claim 24, wherein  $f_{HP3dB}$  has a value of 32 kilohertz.

26. The PSD mask as in Claim 25,  $f_{LP3dB}$  has a value substantially equal to  $\frac{f_0}{2}$ .

27. The PSD mask as in Claim 26, wherein  $K_{ADSL\_OL}$  has a value of 0.1104 watts.

28. The PSD mask as in Claim 27, wherein  $f_0$  has a value of 2.208 megahertz.

**IX. EVIDENCE - APPENDIX**

None.

**IX. RELATED PROCEEDINGS- APPENDIX**

None.